Name: KEY Id#

ISE 307, Term 153

ENGINEERING ECONOMIC ANALYSIS

Quiz# 5

 Date: Sunday, August 28, 2016

#

# **Q1.** Peabody Corporation has the following base-case estimates for its new small engine assembly project:

• Price per unit= $450 increasing at a rate of 10%

• Variable costs = $200 per unit increasing at a rate of 8%

• Fixed costs = $1 million increasing by 100,000 each year

• Demand = 12,000 units per year decreasing at a 5% rate

• Capital investment = $7 million at year 0

• Product life = 5 years

• Salvage value = $2,000,000

• Depreciation method: Seven-year MACRS

• Tax rate= 35%

• MARR = l5%

1. Calculation the depreciation for each year over the product life, the book value at the end of year 5 and the Tax Gains or Losses.

D1 = 7,000,000\*.1429= 1,000,300; D2 = 7,000,000\*.2449= 1,714,300

D3 = 7,000,000\*.1749= 1,224,300; D4 = 7,000,000\*.1249= 874,300

D5 = 7,000,000\*.0893/2= 312,550

B5 = 7,000,000-(1,000,300+,714,300+1,224,300+874,300+312,550)=$1,874,250.

Tax Gains (losses) = 0.35\*(2,000,000-1,874,250)= $44,013

Thus, there will be tax loss of $44,013

1. Develop the project’s cash flows over its project life.
2. Determine the net present worth (NPW) of the project at the company’s MARR of 15%.

 Is this project acceptable?

MACRS Depreciation Schedule with Half Year Convention for 7-Year MACRS property

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
| **14.29** | **24.49** | **17.49** | **12.49** | **8.93** | **8.92** | **8.93** | **4.46** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Income Statement** |   |   |   |   |   |   |
|  | **0** | **1** | **2** | **3** | **4** | **5** |
| **Revenues** |  |  |  |  |  |  |
| **Unit Price** |  | **$450**  | **$495**  | **$545**  | **$599**  | **$659**  |
| **Demand(Units)** |  | **12,000** | **11,400** | **10,830** | **10,289** | **9,774** |
| **Sales Revenue** |  | **$5,400,000**  | **$5,643,000**  | **$5,896,935**  | **$6,162,297**  | **$6,439,600**  |
| **Expenses** |  |  |  |  |  |  |
| **Unit Variable Cost** |  | **$200**  | **$216**  | **$233**  | **$252**  | **$272**  |
| **Variable Cost** |  | **$2,400,000**  | **$2,462,400**  | **$2,526,422**  | **$2,592,109**  | **$2,659,504**  |
| **Fixed Cost** |  | **$1,000,000**  | **$1,100,000**  | **$1,200,000**  | **$1,300,000**  | **$1,400,000**  |
| **Depreciation** |  | **$1,000,300**  | **$1,714,300**  | **$1,224,300**  | **$874,300**  | **$312,550**  |
|  |  |  |  |  |  |  |
| **Taxable Income** |  | **$999,700**  | **$366,300**  | **$946,213**  | **$1,395,888**  | **$2,067,546**  |
| **Income Taxes (35%)** | **$349,895**  | **$128,205**  | **$331,174**  | **$488,561**  | **$723,641**  |
|  |  |  |  |  |  |  |
| **Net Income** |  | **$649,805**  | **$238,095**  | **$615,038**  | **$907,327**  | **$1,343,905**  |
|  |  |  |  |  |  |  |
| **Cash Flow Statement** |  |  |  |  |  |
| **Operating Activities** |  |  |  |  |  |  |
| **Net Income** |  | **$649,805**  | **$238,095**  | **$615,038**  | **$907,327**  | **$1,343,905**  |
| **Depreciation** |  | **1000300** | **1714300** | **1224300** | **874300** | **312550** |
| **Investment Activities** |  |  |  |  |  |
| **Investment** | **($7,000,000)** |  |  |  |  |  |
| **Salvage** |  |  |  |  |  | **$2,000,000**  |
| **Gains Tax** |  |  |  |  |  | **($44,012.50)** |
|  |  |  |  |  |  |  |
| **Net Cash Flow** | **($7,000,000)** | **$1,650,105**  | **$1,952,395**  | **$1,839,338**  | **$1,781,627**  | **$3,612,443**  |
| **PW(15%)** | **($64,767)** |  |  |  |  |  |

# **Since PW(15%)=$-64,767<0, the project is not acceptable.**